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ASTRONOMICAL OBSERVATIONS IN 1912.

Made by TORVALD KÖHL, at Odder, Denmark.

VARIABLE STARS.

(The instrument used is a 3-inch Steinheil, power 42.)

*S Ursæ Majoris.*¹

Jan. 10:	S $\begin{cases} < f. \\ > g. \end{cases}$	Sept. 15:	id.
	19: = g.	18:	id.
Feb. 8:	invisible.	28:	id.
Mar. 8:	2 steps > f'.	29:	id.
	10: 1 step > f'.	Oct. 2:	id.
	12: 2 steps > f'.	5:	id.
	24: 1 step < e.	8:	= g.
	25: id.	Nov. 5:	1 step < e.
Apr. 2:	1 step > e.	15:	= e.
	7: = d.	21:	id.
	12: 2 steps > d.	28:	1 step > e.
Aug. 25:	invisible.	Dec. 2:	$\frac{1}{2}$ step > e.
	31: id.	10:	id.
Sept. 7:	invisible.	15:	$\begin{cases} \text{half way be-} \\ \text{tween d and e.} \end{cases}$
	12: id.	27:	= d.

*T Ursæ Majoris.*²

Jan. 10:	T invisible.	Sept. 18:	id.
	19: id.	28:	id.
Feb. 8:	= e.	29:	id.
Mar. 8:	$\begin{cases} < a. \\ > b. \end{cases}$	Oct. 2:	id.
	10: $\frac{1}{2}$ step > a.	5:	id.
	12: = a.	8:	= g.
	24: 2 steps > a.	Nov. 2:	$\begin{cases} > c. \\ < b. \end{cases}$
	25: = a.	5:	1 step < c.
Apr. 2:	2 steps > a.	15:	= a.
	7: = a.	21:	2 steps > b.
	12: 1 step > a.	28:	1 step > b.
Aug. 25:	invisible.	Dec. 10:	id.
Sept. 7:	id.	15:	= b.
	12: id.	27:	1 step > b.
	15: id.		

¹ Vide the sketch in the *Publications A. S. P.*, No. 73, 12, 56.² Vide the sketch in the *Publications A. S. P.*, No. 22, 4, 63.

*W Pegasi.*¹

Jan. 7:	W { < g. > h.	Oct. 6:	= c.
Mar. 14:	very faint.	8:	id.
Apr. 18:	invisible.	9:	id.
Aug. 6:	2 steps > c.	18:	{ 2 steps > d. 4 steps < c.
25:	= b.	Nov. 5:	2 steps > e.
31:	2 steps < b.	8:	1½ steps > e.
Sept. 7:	1 step < b.	15:	1 step < e.
11:	= b.	28:	1 step < g.
15:	1 step < b.	Dec. 2:	= f.
18:	{ half way be- } tween b and c.	10:	1 step > h.
28:	id.	12:	id.
Oct. 2:	2 steps > c.	27:	1 step < h.

*SS Cygni.*¹

Jan. 7, 6 ^h :	SS 1 step < h.	Oct. 9, 9 ^h :	id.
10, 6 ^h :	id.	10, 8 ^h :	id.
Mar. 24, 16 ^h :	{ half way be- } tween c & d.	18, 9 ^h :	= d'.
Aug. 25, 9 ^h :	invisible.	Nov. 5, 6 ^h :	very faint.
31, 9 ^h :	id.	8, 10 ^h :	1 step < h.
Sept. 7, 9 ^h :	id.	28, 7 ^h :	invisible.
11, 10 ^h :	2 steps < h.	29, 7 ^h :	id.
12, 10 ^h :	3 steps < h.	Dec. 2, 9 ^h :	1 step < f.
15, 9 ^h :	1 step < h.	10, 10 ^h :	{ 2 steps < b. 3 steps > c.
18, 9 ^h :	= h.	12, 7 ^h :	2½ steps > c.
29, 7 ^h :	invisible.	15, 5 ^h :	{ half way be- } tween c & d.
Oct. 2, 8 ^h :	= g.	27, 5 ^h :	= h.
6, 9 ^h :	= c.		
8, 9 ^h :	{ 2 steps > c. 5 steps < b.		

*Z Cygni.*²

Mar. 24:	Z = a.	Oct. 6:	id.
Apr. 12:	id.	18:	< e.
16:	1 step < a.	Nov. 8:	5 steps < e.
19:	½ step > a.	28:	invisible.
May 15:	2 steps < a.	29:	id.
Sept. 11:	4 steps < e.	Dec. 2:	id.
15:	id.	10:	id.
18:	invisible.	12:	id.
29:	id.	15:	= e.
Oct. 2:	very faint.	27:	= d.

¹ Vide the sketch in the *Publications A. S. P.*, No. 141, 24, 109.

² Vide the sketch in the *Publications A. S. P.*, No. 100, 17, 16.

*U Herculis.*¹

Mar. 25:	U 2 steps < f.	Sept. 15:	id.
Apr. 10:	= g.	18:	id.
12:	id.	28:	id.
18:	1 step < g.	29:	id.
20:	1 step > g.	Oct. 2:	id.
Aug. 25:	invisible.	5:	id.
Sept. 7:	id.	8:	id.
11:	id.	Nov. 28:	id.
12:	id.		

*S Persei.*²

Mar. 24:	S very faint.	Oct. 2:	id.
Apr. 12:	id.	6:	1 step < e.
16:	invisible.	8:	id.
19:	id.	18:	1 step > e.
Sept. 12:	= f.	Nov. 5:	½ step > e.
15:	id.	29:	1 step < c.
18:	{ half way be-	15:	= d.
	} tween f and e.	27:	= b.

Several other stars have been watched, such as *Y Tauri* (B. D. + 20° 1083), which in the first months of the year was a little brighter, in the last months a little fainter, than the star B. D. + 20° 1095. — *TV Cygni*¹ was noted April 12th and September 11th: 4 steps > d, but on August 6th: 2 step > d.

LARGE METEORS.

Fireballs have been observed from stations in Denmark on the following dates: January 29th, February 3d, 17th, 28th, March 8th, April 18th, 21st, 22d, 23d, 26th, June 5th, 6th, July 14th, 16th (two), August 28th, September 15th, October 8th. The last-named fireball was observed from fifty-five (fourteen Danish and forty-one Swedish) stations.

SHOOTING-STARS.

Shooting-stars were observed from six stations in Denmark on August 9th and 10th. At these stations seventy-eight paths of shooting-stars were mapped, and seven proved suitable for calculation, under which four fireballs were included — the meteors on July 16th, August 28th, September 15th, and October 8th. These seven meteors have given the following results:—

¹ Vide the sketch in the *Publications A. S. P.*, No. 135, 23, 42.

² Vide the sketch in the *Publications A. S. P.*, No. 135, 23, 43.

From Observation.

No.	Time, P. M.	Station.	Beginning.	Ending.	Mag.	Observer.
1	July 16, 11 ^h 1 ^m 0 ^s	{ Krägelund Charlottenlund		15° + 65° 168 + 43		R. JENSEN F. ORLUF
2	Aug. 9, 10 25 45	{ Varde Odder		42 + 47 93 + 82	1 2½	N. H. BOSSEN T. KÖHL
3	Aug. 9, 10 38	{ Nordby Odder		0 + 38 290 + 33	2 3	J. SKAKKE T. KÖHL
4	Aug. 10, 10 48	{ Varde Jyderup Copenhagen	58° + 53° 120 + 69	51 + 55 167 + 66 186 + 52.5	 1 1	 N. H. BOSSEN M. POVLSEN KIERULFF
5	Aug. 28, 10 8	{ Nyborg Ringsted		83 + 49 159 + 58		T. VAABEN CHRISTENSEN
6	Sept. 15, 10 10	{ Faxø Oestermarie		35 + 11 280 + 33	½ C	LAU J. BÖGESKOV
7	Oct. 8, 6 57	{ Mern Oestermarie		62 + 38 145 + 54		J. LARSEN J. BÖGESKOV

From Calculation.

No.	Beginning			Ending			Real length of path. β	Radiant.	
	h	λ	ϕ	h	λ	ϕ		AR	Decl.
1				90.0	2° 19'.8 w	56° 49'.0			
2				79.1	2 21.6 w	56 35.8			
3				99.5	2 29.5 w	55 36.4			
4 A	173.6	1° 14'.3	57° 48'.9	125.5	2 10.4 w	56 59.3	120.1	70° + 49°	
B				125.5	2 9.8 w	56 59.7			
C				126.9	2 11.4 w	56 59.7			
5				33.1	1 7.5 w	56 1.0			
6				54.8	1 48.1 e	55 0.8			
7				61.5	1 51.6 e	56 27.8			

h and β are expressed in kilometers; λ is longitude from Copenhagen; ϕ is north latitude; h is the altitude of the meteor above the Earth's surface. The combination of Varde-Jyderup is marked *A*, Varde-Copenhagen *B*, and Jyderup-Copenhagen *C*.

The attempt has been made to calculate the *true diameter* of meteor No. 6, with 126 meters as the result.

My Meteor-Catalog has now reached a number of 5,533 meteors, observed from stations in Denmark and surrounding countries from 1875 to 1812, inclusive.

From August 12th to 17th, inclusive, astronomical lectures were held at the Carina Observatory in Odder. In the estimation of variable stars I often have been assisted by Mr. J. SKAKKE.